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ABSTRACT

This training manual for emergency medical technicians, one of 14 modules that comprise the Emergency Victim Care textbook, covers childbirth and pediatric emergencies. Objectives stated for the two chapters are for the students to be able to describe: emergency procedures for normal childbirth, unusual childbirth emergencies, emergency care for the premature infant and for the woman suffering from a miscarriage, emergency baptismal procedures, and emergency care for specified pediatric emergencies. Informative material is provided on normal deliveries; unusual deliveries; premature infants; miscarriage; emergency baptism; pediatrics and child development; specific pediatric emergencies, such as airway obstruction, artificial ventilation, cardiac massage, fever, convulsions; pediatric patients with heart defects; neurological evaluation of infants; and child abuse. (YLB)

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EMERGENCY VICTIM CARE

Module 11

—Childbirth
—Pediatric Emergencies



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EMERGENCY VICTIM CARE

A TRAINING MANUAL FOR EMERGENCY MEDICAL TECHNICIANS

OHIO TRADE AND INDUSTRIAL EDUCATION SERVICE

**DIVISION OF VOCATIONAL EDUCATION
STATE DEPARTMENT OF EDUCATION
COLUMBUS, OHIO**

TO THE LEARNER

The 1983 Emergency Victim Care textbook revision has been grouped into 14 modules. The modules have been grouped by content matter as follows:

Module 1

Preface
Foreword
Acknowledgment
Student-Instructor Relationship

Personnel
Emergency Medical Service Vehicles
EMS Communication
Records and Reports

Module 2

Equipment
Safe Driving Practices
Legal Aspects
Controlling the Situation
Action Evaluation Conference

Module 3

Anatomy & Physiology

Module 4

Vital Signs
Patient Assessment

Module 5

Cardiopulmonary Resuscitation (CPR)

Module 6

Bleeding Control
Wounds and Bandaging
Shock

Module 7

Medical Emergencies

Module 8

Crisis Intervention
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Module 9

Backboards/Moving and Handling the Victim
Fractures
Dislocations

Module 10

Injuries of the Eye, Ear, Nose, Abdomen,
C.N.S. and Genitalia
Burns and Environmental Injuries

Module 11

Childbirth
Pediatric Emergency

Module 12

Water Accidents
Electrical Emergencies
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CHILDBIRTH

OBJECTIVES

Upon completion of the following chapter, you will be able to:

- explain emergency care and procedures for normal childbirth.
- identify unusual childbirth emergencies.
- describe emergency care for the premature infant.
- describe emergency care for the woman suffering from a miscarriage.
- describe emergency baptismal procedures.

Following instruction and/or practice, you will be able to:

- administer emergency care to a woman during labor, delivery or post delivery.
- perform emergency treatment during an unusual childbirth emergency.
- administer emergency care to a premature infant.
- perform an emergency baptism.

INTRODUCTION

A growing problem confronting EMTs today is emergency childbirth. EMTs often must decide whether to transport the expectant mother to a medical facility or keep the mother in her home and attend the birth of the child. Because EMTs must solve this problem, it is of the utmost importance that all EMTs have some fundamental knowledge about the conditions surrounding childbirth.

NORMAL DELIVERIES

A woman in labor and/or a newborn child certainly can present many difficult situations. Unless EMTs have proper knowledge and training in this particular area of emergency care, great harm may be done to the mother and/or child.

Although it is not the intention of this chapter to perfect EMTs in the art and science of obstetrics, there is a real need to give such personnel a working knowledge of what to expect. Because lives may be in the balance, EMTs must decide quickly if an expectant mother should be transported to a hospital. This decision is made depending upon certain evidence the EMT must evaluate immediately.

The expectant mother is to be transported only before the evidence of crowning is apparent. If **crowning** is apparent, childbirth will follow soon after. In such a case, the mother should not be moved at all unless EMTs are otherwise directed by a physician.

EMTs must have some concept of what takes place before, during, and after labor to be able to best care for the mother and child. This material, however, will deal mainly with the period during labor since this is usually the period in which victim care arises. Therefore, the EMT should have some knowledge of what is normal and abnormal in childbirth.

DEFINITIONS

Obstetrics is the care of the childbearing woman and her newborn baby. Obstetrics deals basically with three distinct periods.

1. **Pregnancy**—The period from conception through the period of labor to birth of the child.

2. **Labor**—The period during which the baby and the placenta are expelled from the mother's body into the outside world.

3. **The Puerperium (Post Delivery)**—The period during which the organs of reproduction are restored to approximately their former size and condition. This usually takes about six weeks.

Internal Organs—The internal organs of reproduction are (a) the ovaries, (b) the fallopian tubes, (c) the uterus, and (d) the vagina.

Ovaries—The ovaries are the glands in the female producing the reproduction cell known as the ovum.

Fallopian Tubes—The fallopian tubes are two, thin, trumpet-shaped, flexible muscular tubes, about four and one half inches long and somewhat thinner than a lead pencil. They have two openings, one into the uterine cavity and the other into the abdominal cavity. The abdominal opening is somewhat larger and is surrounded by a large number of fringes; hence the term "fimbriated end." The fallopian tubes act as a passage from the ovaries to the uterus.

Uterus—The uterus, or womb, is a thick-walled, muscular, hollow, pear-shaped organ. Fully developed, in nonpregnant state, it is approximately three inches long, two inches wide, one inch in thickness, and weighs from one to two ounces. It is composed of involuntary muscle fibers, running in different directions, making its expansion possible up to the size of a pumpkin. At termination of pregnancy it weighs about two pounds. The muscles of this organ are arranged so as to make it able to expel its

fetus (infant) by contraction at the termination of normal labor. (See Figure 1.)

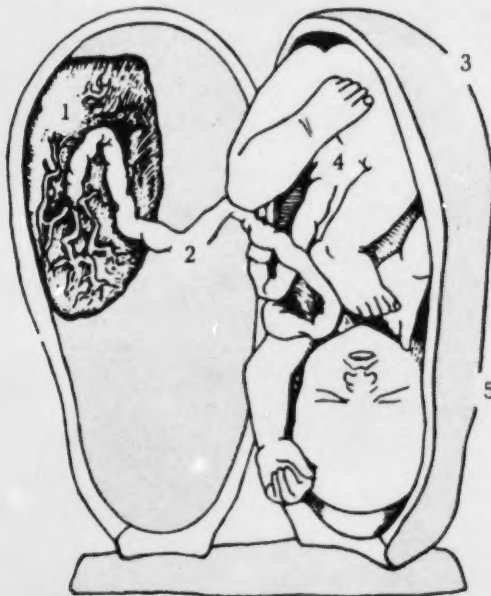
Amnion (Bag of Waters)—This is the thin, transparent sac which holds the fetus suspended in fluid called amniotic fluid. This sac is lined with a smooth, slippery, glistening membrane. The space, or the amniotic cavity filled with fluid, is often called "the bag of waters." Here is where the child floats and moves. At full-term pregnancy this cavity normally contains from one half to one quart of water. The important functions of this fluid are:

1. To protect the fetus from blows
2. To allow the fetus freedom of motion
3. To keep the child at an even temperature
4. To help enlarge the vaginal canal during labor so the child may be born more easily
5. To flush the birth canal (when membranes rupture), thereby cleansing and lubricating it

Placenta (Afterbirth)—By the third month another important structure, the placenta, has formed. The placenta is a fleshy, dishlike organ. Late in pregnancy it measures about eight inches in diameter and one inch in thickness. It receives its name from a Latin word meaning cake, which this structure resembles somewhat in shape.

A tree or a plant sends its roots into a bed of earth for nourishment, and when the plant is removed a certain amount of the earthy bed clings to the interlocking roots. Similarly, a thin layer of the uterine bed clings to the branching projections and together they make up this organ which supplies food to the fetus as roots and the earth provide nourishment for a plant. At term a placenta weighs about one pound. Its surface is smooth and glistening, and beneath this membrane may be seen a number of large blood vessels.

The placenta and the child are connected by means of the umbilical cord. This cord is fastened to the center of the placenta and from there enters the abdominal wall of the child. It



1. Placenta: usually attached on rear wall
2. Umbilical cord: it is about 20 inches long
3. Fundus of uterus
4. Infant's navel
5. Front wall of uterus

Figure 1. Unborn child

is usually about 20 inches in length and three quarters of an inch in diameter. It contains two arteries and one large vein which are twisted upon each other and are protected from pressure by a transparent, bluish-white, gelatinous substance called jelly.

LABOR

Labor is the process by which the child is expelled from the uterus. It is divided into three stages: dilation, expulsion, and placental.

FIRST STAGE—DILATION

The first stage of labor begins with the first symptoms of true labor and ends with the complete dilation of the vaginal canal.

EMERGENCY CARE

1. Reassure the victim. The EMT should display an attitude of cheerfulness, sympathy, and encouragement toward the expectant mother.

2. Observe the character of the pains. The frequency, duration, and intensity of the pains should be watched closely and recorded. The

presence of "show" (bloodstained mucus, not actual bleeding) in substantial amounts suggests that rather rapid progress may be taking place and should be reported, particularly if associated with frequent, severe pains.

3. Urge the victim not to bear down, instead, encourage her to pant during contractions. During the first stage of labor, uterine contractions are involuntary and uncontrolled by the victim. Not only is it futile for her to bear down, this leads to exhaustion and may tear parts of the birth canal.

If the EMT determines the mother is in the first stage of labor, preparations should be made to transport her to the hospital.

SECOND STAGE—EXPULSION

Watch for signs of the second stage. These signs are as follows.

1. The victim begins to bear down on her own accord.

2. There is a sudden increase in vaginal discharges; sometimes there may be slight, actual

bleeding. This indicates the child's head is passing through the completely dilated birth canal.

3. The victim thinks she needs to evacuate; this symptom is due to pressure of the head on the perineal floor and consequently against the rectum.

4. The membrane ruptures with discharge of fluid. This, of course, may take place at any time but occurs most frequently at the beginning of the second stage.

5. The vaginal opening begins to bulge and the anal orifice to dilate. This is a late sign but if 1, 2, 3, and 4 occur, the appearance of the infant should be watched for with every pain. Only the appearance of the head (crowning) can definitely confirm this suspicion. Vomiting at

this time is not unusual. If vomiting occurs, take precautions against strangulation.

Crowning—The vaginal opening will bulge and the top of the child's head will actually be seen. This is called crowning. Crowning is the very last symptom before the head and then the child are actually delivered. See Figure 2.

If examination of the birth canal during a contraction reveals the mother is crowning, this will indicate the infant may be born almost immediately. In this case, the EMT should not attempt to transport the mother to a hospital, but should be prepared to deliver the baby in the next few minutes. If she is not crowning during the contraction, EMTs will probably have



Figure 2. "Crowning." The appearance of the baby's head at the height of a labor pain.



Figure 3. Support the baby's head as it continues through the birth canal

time to reach a hospital. In such case, the mother should be transported.

If it is established that the EMT must help in the delivery, one EMT should obtain the following equipment from the emergency vehicle: (a) O.B. kit, (b) bag-mask, (c) oxygen inhalator. This equipment should be brought to the delivery area and made ready.

Figures 3 through 9 show stages of a normal delivery. The head usually is delivered with the face down and rotates toward one of the mother's legs. It should be supported by the rubber-gloved hand of an EMT. Gloves should be sterile.

While supporting the head, check to find if the cord is wrapped around the neck. If it is,



Figure 4. Delivery of the baby's head

run your finger between the cord and the child's neck to loosen the cord. If the cord is too tight, clamp it twice and cut between clamps.

After the head is delivered, contraction of the uterus will continue until the shoulders are delivered. Do not pull. The mother sometimes has difficulty delivering the shoulders because of their width. The top shoulder is usually the first one to present itself. Slight traction on the head



Figure 5. Head and neck completely delivered. If the cord is wrapped around the neck, attempt to loosen it with your finger. If the cord is tight, clamp it twice and cut between the clamps.

toward the floor will help deliver the upper shoulder (see Figure 7). Slight traction on the head toward the ceiling will help deliver the bottom shoulder. Continue to support the child and be ready for sudden expulsion. After both shoulders are delivered, the baby may follow very quickly. Guard the cord so as not to tear loose the placenta.



Figure 6. *Aspirate the baby's mouth and nose. Be sure to squeeze all air out of the bulb syringe before inserting it into the baby's mouth or nose.*



Figure 7. *Delivery of the shoulders, if necessary, can be accomplished with slight traction on the head; down, to assist delivery of the top shoulder, and up, to assist delivery of the bottom shoulder. DO NOT PULL. Continue to support the baby at all times. Expulsion may be very rapid.*



Figure 8. Delivery is complete. Hold the baby securely for it is slippery. The baby will be placed across the mother's abdomen on its side with head slightly lower than the rest of the body to facilitate the flow of mucus and fluid.



Figure 9. Continue aspirating fluids, and clearing of the air passage. If the baby is not breathing, stimulate and start artificial respiration. NOTE: Empty the bulb syringe of all air before inserting the tip into the baby's nose or mouth.

CARE OF THE CHILD

The child is now on its own and should start to breathe. To safeguard the child, the EMT should:

1. **Turn the child on its side across the mother's abdomen.** This will facilitate the flow of mucus out of the mouth.

2. **Clear the air passage.** Wipe the mouth inside and out with a gauze bandage (4" × 4"). By placing another gauze compress (4" × 4") over your index finger and placing your finger in the child's mouth, gently clean out all foreign bodies and mucus. Use bulb syringe to aspirate fluids. Be certain all air has been squeezed out of the syringe before inserting it into the baby's mouth and nose.

Note: A newborn baby breathes primarily through the nasal passage; therefore, making certain the nose is clear of mucus is just as important as cleaning out the mouth.

The above should be carried out in all deliveries whether the child breathes immediately or not.

3. **If the child starts to breathe,** your attentions should then be turned to the mother and the cord.

If steps 1 and 2 above have been completed and the newborn does not breathe, the EMT must start some type of resuscitation.

4. **Stimulate the child.** This can be done by rubbing the child with your hand. **Do not slap the child.** You may also snap the child on the bottom of the feet with your index finger. The child should be left on the side for this.

5. **Use manual artificial respiration.** Leave the child on side and aerate by mouth-to-mouth and/or mouth-to-nose breathing. This should be done once or twice. If able to breathe alone, the child will. If the child does not:

6. **Continue artificial respiration.** This must be continued until the child begins to breathe or until the child is pronounced dead by a physician. Transport the child as soon as possible.

CARE OF THE CORD

After the child is breathing, attention should be turned to the cord. As a safety measure, the EMT needs to know the procedure for cutting the cord when the mother must be moved under awkward conditions. Those who have tried to carry a new mother down three flights of stairs with a newborn balanced on her abdomen know the safety problem. There are instances when the child should be separated from the mother.

Tying the cord — Place a sterile cord clamp or tie approximately six to nine inches from the baby's abdomen. Cord ties and clamps can be purchased through drugstore or hospital supply companies. Each tie is 1/8" × 12". Ties are made of cotton and can be purchased sterile.

Approximately one inch further away from the tie or clamp, place another tie or clamp. When tying the cord, use square knots and put at least three knots in place.

Cutting the cord—Between these two clamps or ties, cut the cord with sterile scissors. This physically separates the living and breathing child from the mother.

Put the child in a soft blanket and place in the care of a competent person. The child should be kept laid on side with the head slightly lower than the body.

As an EMT you should check with local physicians as to the desired procedure to be carried out when cutting the cord in an emergency delivery.

THIRD STAGE—PLACENTAL

From the time the child is delivered until the placenta is delivered is the third stage of labor. The placenta usually appears within 30 minutes. See Figures 10 through 14. There will be one or two cups of blood delivered with the placenta. This is a **normal** amount.

After the placenta is delivered, it should be preserved in some type of container or wrapped in a newspaper. This must be kept and taken to the hospital with the mother and child so it

can be examined to see if any particles have been left in the uterine cavity.

A sterile, sanitary napkin can be placed in position at this time. Be sure it is sterile. Individually wrapped sterile napkins should be included in the O.B. pack.

NOTE: After delivery of the placenta, feel the uterus through the abdominal walls. If it feels relaxed and soft, and if there is excessive vaginal bleeding, the EMT should gently massage or "knead" the uterus. This will assist in the contraction of the uterus and retard the flow of blood. Continue to massage the uterus until it feels firm.



Figure 10. The cord has been clamped and cut. The placenta will be delivered by continued contractions of the uterus.



Figure 11. The appearance of the placenta accompanied with the normal flow of blood

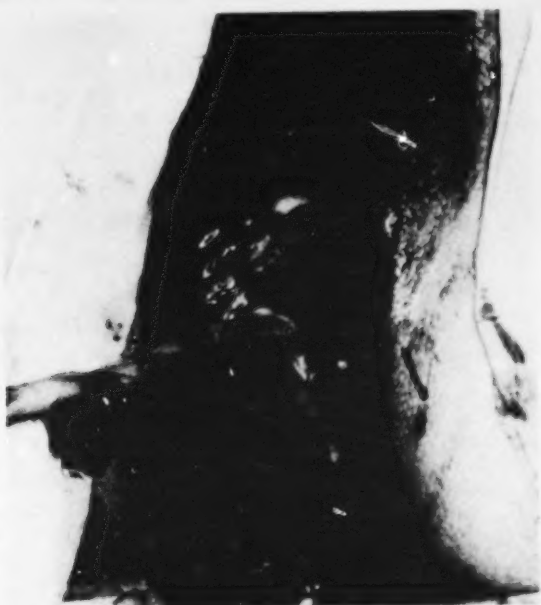


*Figure 12. Continued delivery of the placenta.
Do not pull on the cord.*



*Figure 13. Delivery of the placenta. It must now
be placed in a plastic bag or similar container
to be taken to the hospital with the mother
and baby.*

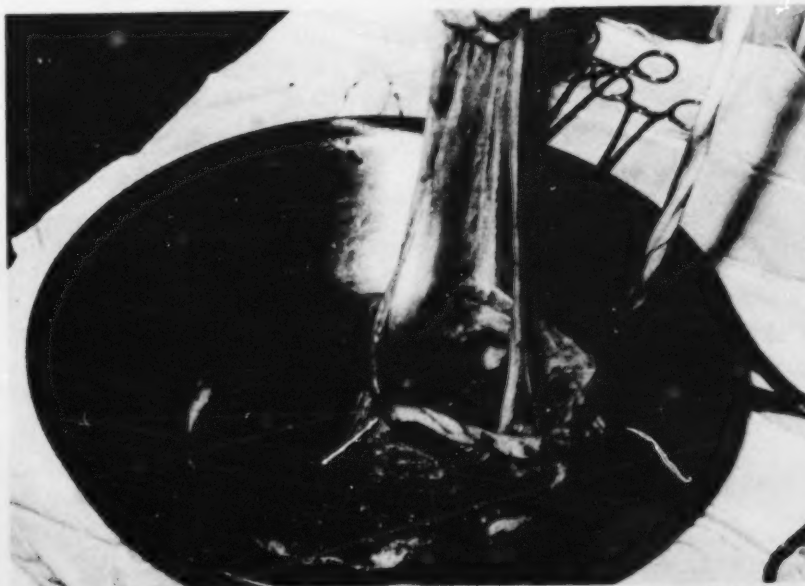


*Figure 14. The placenta showing the amniotic sac which contained the baby and amniotic fluid
during pregnancy.*

Figures 2 thru 14 Courtesy, Dept. of Obstetrics, Euclid General Hospital
By Robert C. Waltz, M.D.

FINAL STEPS IN EMERGENCY CHILDBIRTH

For the following reasons the mother and child must be in the hands of medical personnel before the EMTs leave them.

1. The child must have a physical examination.

2. The mother must have a physical examination including the checking of her birth canal for lacerations.

3. The newborn's eyes must be cared for to prevent any serious eye infection. (This is a state law in Ohio.) Silver nitrate is usually used and this function normally is performed by a physician.

4. The cord must be checked by competent medical personnel.

5. Baby and mother must be observed for a period of time.

If the physician should ask the EMTs to make out the birth certificate, they may do so. Many times the physician may ask that this be done because the EMT was present at the actual delivery.

Birth certificates can be obtained at the local county health office. They must be made out as soon as possible after the birth and filed with the proper registrar in the county health office.

UNUSUAL DELIVERIES

DEFINITION

The term "breech," in connection with childbirth, refers to the birth of the infant in a reverse position, as contrasted with normal head-first delivery.

In normal childbirth, the child will usually start to breathe as soon as the chest is exposed, or shortly afterward. Due to the nature of the breech type of birth, the child's chest is delivered before the head. It is impossible for the child to take in air, as the air passages are blocked and the head is still within the vaginal canal.

EMERGENCY CARE

Immediately after learning it is going to be a delivery in a breech position, the EMT should be ready to support the child. This can be done by letting the child rest on the EMT's hand and arm, thus allowing the infant's leg to straddle the EMT's arm.

The legs, hips, stomach, and chest will be delivered at this point. Sometimes it will be

harder for the mother to deliver the head and, in more severe cases, the delay is quite long. If this happens, the child may suffocate as the result of a poor air passage.

An air passage may be created by the EMT supporting the body of the infant with one hand and inserting the index and second finger of the other hand into the vaginal canal in such a way that the palm faces the baby. Run the fingers around the child's neck until the chin is found. At this point the two fingers should be run between the child's chin and the vaginal canal. As the child's nose is reached, the EMT should separate the fingers enough so as to run one on each side of the child's nose. When in this position the EMT's fingers should be pushed away from the infant's face, in turn, facilitating a good airway. The EMT should keep the fingers in this position until the entire head is delivered.

This is the **only** time the EMT should touch the vaginal area. The EMT should wear sterile gloves for this procedure.

OTHER CHILDBIRTH EMERGENCIES

On arrival, the EMT may find that the cord, a foot, or a hand is protruding from the birth canal. Transport this mother at once, taking special care not to injure the prolapsed part. Do not try to replace the prolapsed part in the vaginal canal!

If a hand or foot is protruding, cover it with a sterile towel or as clean a piece of material as is available.

If the cord should be protruding, the child may be in danger. This danger is caused by the cord being under direct pressure due to its position between the head and the birth canal. While the cord is in this position, the child might not be receiving an adequate amount of blood and oxygen.

EMERGENCY CARE

Transport this mother at once! In case the cord is protruding, place the mother on her back with her hips elevated on two or three pillows or folded blankets. This will cause the child to drop a little into the uterus. If the mother can be maintained in a knee-chest position (**balance supported by the EMT**) this position is preferred to the elevated-hip position. However, this is a very difficult position to maintain during transport, and special precautions must be taken to safeguard the mother if this position is used. These positions will relieve some of the direct pressure pinching the cord.

Another unusual condition that the EMT must be aware of is that the baby may still be enclosed

in the amniotic sac (bag of waters) when the delivery begins. If this condition exists, the bag must be broken and pulled away from the baby's mouth and nose immediately. Care must be taken when breaking the sac as not to injure the baby. This can be accomplished by pulling the bag away from the baby and then breaking it.

If when questioning the mother, the EMT learns that the mother's previous child had been delivered by cesarean section, the EMT must be aware of an additional complication. There is a possibility of the old scar on the wall of the uterus (left there by cesarean section) rupturing during a normal delivery, thus causing internal bleeding that could be severe. This mother should be transported immediately. However, if she is crowning, the EMT should deliver the child, then transport without delay.

MULTIPLE BIRTHS

The delivery of twins, or even more than two babies, should not be considered a complication. If the delivery is normal, they are delivered in the same manner as a single baby. It could be a few to several minutes between the deliveries.

After the first baby is born, tie the cord as you would in a single birth. Treat the second baby the same.

Multiple births are frequently born before they are full term. They may be considered premature, so remember the importance of keeping the infants warm.

PREMATURE INFANTS

An EMT should consider a baby premature if born before seven months of pregnancy, or having a weight less than five and a half pounds. Time should not be spent in trying to guess the weight or even weighing the baby. Base your judgment on the baby's appearance or on the history given you by the mother.

A premature baby will be much smaller and thinner than a full-term baby. The head will be larger in comparison to the rest of the body and more red in color.

EMERGENCY CARE

Premature babies need special care. With proper care, even very small babies weighing two pounds or less have a chance to survive. The delivery of the baby will be handled as any other delivery. The following points are very important in handling a premature baby.

1. Body temperature—The baby should be wrapped in a warm blanket and kept in a place where the temperature is close to 90°. A makeshift incubator can be provided by wrapping the blanket-wrapped baby in aluminum foil. Keep the face uncovered while in the home and vehicle, but cover it while taking baby from house to vehicle and from vehicle to hospital. In cold weather be sure vehicle heater is turned on before placing baby inside.

2. Air passage—Keep baby's air passages clear of all fluid and mucus. Use sterile 4" × 4" inch gauze pads to wipe mucus from nose and mouth. When using bulb syringe, be certain all air has been squeezed out of the syringe before inserting in baby's mouth or nose (release bulb slowly).

3. Bleeding—Examine end of umbilical cord carefully. Be certain it is not bleeding. If it is (even the slightest), put a second clamp or tie on it.

4. Oxygen—Oxygen should be administered. However, it must be administered very carefully. A makeshift tent should be made over the baby's head. Oxygen should be directed at the top of the tent and not directly at the baby's face. Oxygen can have certain dangers for the premature baby; however, given gently and for a relatively short time (15 to 20 minutes), the benefits outweigh the dangers.

5. Contamination—A premature baby is susceptible to infection. Do not cough, sneeze, talk, or breathe directly into the baby's face. Keep everyone as far from the baby as possible.

Note: Special incubators or infant carriers for transporting premature babies are available in some areas. An emergency medical service should know if this equipment is available, where it can be obtained and how it is used.

MISCARRIAGE

DEFINITION

A miscarriage is the giving off of the membranes and the unborn child before the child is able to live on its own. This usually occurs before 28 weeks of pregnancy have passed. Such a miscarriage can take place any time between conception and the time just before the child is able to live independently. Although the outward symptoms may vary, the following symptoms will be present.

SIGNS AND SYMPTOMS

1. Fast pulse
2. Perspiration
3. Pallor (pale skin)
4. Weakness - inability to stand
5. Cramping pain in the abdomen

6. Moderate to severe vaginal bleeding

7. Discharge of large or small particles from the vaginal canal

In other words, there will be all the symptoms of shock plus, in most cases, bleeding from the vagina.

EMERGENCY CARE

1. Place victim in shock position.
2. Conserve body heat.
3. The EMT may moisten the patient's lips if she requests it.
4. Do not touch the vaginal area as the victim is prone to infection.
5. The EMT may put sterile towels or vaginal pads (sanitary napkins) at the vaginal opening.

EMERGENCY BAPTISM

All Christians are alike in that they believe in God. Different faiths, however, differ in their beliefs about baptism and who may perform baptism.

Some faiths believe that in case of an emergency when a baby is stillborn or death appears imminent, any baptized person, regardless of religious beliefs, may baptize **at the request** of the Christian parents or legal guardian.

With this in mind, the standard form for emergency baptism for those Christians whose

faith allows emergency baptism by a layperson is as follows.

Have one witness if possible, and while sprinkling a few drops of water on the baby's forehead say, "I baptize you in the name of the Father and of the Son, and of the Holy Spirit." Continue resuscitation efforts during and after the baptism.

PEDIATRIC EMERGENCY

OBJECTIVES

Upon completion of the following chapter, you will be able to:

- describe emergency care for specified pediatric emergencies such as:
 - airway obstruction
 - artificial ventilation
 - cardiac massage
 - fever
 - convulsions
 - pediatric patients with heart defects
 - Reye's Syndrome
 - dehydration
 - neurological evaluation of infants
 - child abuse

Following instructions and/or practice, you will be able to:

- administer emergency care for specific pediatric emergencies.

INTRODUCTION

Trauma is the leading cause of death in children. Prompt, effective action is especially desirable when dealing with injured children. A child's life saved offers a promise of years of productive activity, whereas an injury compounded by a mistake can result in many years of disability.

Remember, children are fearful of the strange and unknown. The EMT will normally be a stranger to the child; and the pain of injury or the confinement of bandages or splints, or the use of oxygen equipment will be the unknown to the child.

When examining a child, some of the procedures may have to be altered. A child of nine or 10 years of age can be expected to give helpful information when questioned, but a child of three or four cannot. Regardless of age, the EMT must always use simple language, never ask complicated questions and be very gentle with the examination and care. The EMT should explain everything being done and going on around and about the victim.

The child's parents, if present, may be able to calm the child. It is also possible they may be so upset themselves they cause more problems. In most cases, children and one or both parents should be transported together. The EMT must use good, common sense in handling each situation.

Some EMTs are completely comfortable when dealing with children and some are not. A crying child surrounded by distraught parents and onlookers can challenge the confidence of the most experienced professional. It is hoped that by reading the following pages you will better understand the development and psychological growth of children.

PEDIATRICS AND CHILD DEVELOPMENT

Pediatrics is that phase of medically related care and concern dealing with individuals from birth to the age of maturity. The process of maturing is complex, including not only physical growth, but emotional, intellectual and biological development. Whereas the adult will alter little during the remainder of life, the child will increase in size and stature, become proficient in motor and intellectual skills, and develop emotional controls from the rudimentary state of the newborn to the complex, highly integrated level of the adult.

A study of pediatrics includes not only conditions that are almost exclusively those of childhood but also areas in which the state and growth and development of the child can influence any observations or care that may be considered or required.

To understand how a child can be affected by illness or injury we need guidelines outlining "normal" growth and development. From birth to maturity a child changes so rapidly and drastically that to facilitate an understanding we need to divide those years into segments. They are:

Newborn:	from birth to one month
Infant:	from one month to one year of age
Toddler:	from one to three years of age
Preschooler:	from three to six years of age
School age child:	from six to 13 years of age
Adolescent:	from 13 to 18 years of age

Each segment has its own characteristics, not only of growth but the continuing development that will lead the child into adulthood.

Growth and development, although orderly, do not progress at the same speeds. The tremendous rate of fetal growth slows after birth and continues to decelerate until maturity except for a spurt in adolescence.

Weight—The average weight at birth is 7½ pounds but may fall within the normal range of 6 lbs. 5 oz. to 9 lbs. 2 oz. Birth weight usually doubles by five months and triples by one year.

Length—The average length at birth is from 19-21 inches and will increase by approximately 50% during the first year.

Growth—During the first six months growth appears mostly in the head and trunk. Later

the legs begin to stretch and straighten but even at the end of the first year the child's body will seem out of proportion.

Head—Skull growth advances rapidly, accommodating an expanding brain, and the skull will reach two-thirds its adult size by the end of the first year although the rest of the body will be only about one-fourth the adult size. The rapid expansion of the brain is possible because the infant's skull is fashioned of separate bones which will not unite permanently until brain growth is completed. The cracks between the bones (sutures) can be felt in a newborn in two areas, one on top of the head (the anterior fontanel) and one at the back (the posterior fontanel); the openings will remain obvious for longer periods. The posterior fontanel usually closes by two months but the anterior fontanel, depending on its size, will not completely close until about 18 months of age. The underlying brain in these areas is protected by a tough membrane called the dura mater.

Chest—The circumference of the chest at the nipple line is approximately the same as the head until about six months when it begins to expand. The chest wall is thinner and more elastic in infants, making certain breath sounds within the chest more audible than later in life. As the chest expands the lungs are the first to increase in size, permitting them to ventilate more efficiently. The heart grows in size but less rapidly than the chest and lungs. In fact, at one year it may even appear smaller than at

birth and lies almost horizontally, but will start increasing in size and changing position as general growth continues.

Abdomen—No significant development of abdominal muscles occurs during the first year, accounting for the pot-bellied appearance of the infant, whether sitting or standing. The liver grows in proportion to the body and can still be felt under the margin of the right ribs by the end of the first year. Kidney function, reduced at birth, improves during the first year and approaches adult performance by the first birthday.

Bones—Growth appears first in the long bones and in the spine. During growth the bones are first formed of cartilage which gradually changes to bone substance.

Blood—Newborns have high levels of red blood cells and hemoglobin (the oxygen-carrying component of blood). These counts decline rapidly during the early weeks of life, reaching a low point at about four months of age in childhood. White blood counts (the cells responsible for fighting infection) are high during the first few weeks, then decline by the end of the first year.

Newborn (from birth to one month of age)—The newborn period is probably the most critical time in life. At birth, drastic changes occur within the baby's body resulting from the physical separation from the mother. If the body's development is not complete or if defects exist, there may be a threat to life. Most of these defects, conditions and illnesses are noted when the baby is but a few hours to a few days old and comprehensive treatment is begun at this time. Because of all the complications that can occur, this period has the greatest mortality rate that will be encountered until old age. In fact, of all deaths recorded within the first year, two-thirds will occur within the first month.

Infant (from one month to one year of age)—The physical growth of the first year occurs fairly rapidly. Accompanying this growth are remarkable developments in the infant's ability to handle its own body and to communicate with the outside world.

So many changes occur within this year that it is usually broken down into three-month segments.

1-3 months—During this time the infant gains better head control; begins to fix the eyes on large, brightly colored objects; and the face becomes more animated. Tears are now visible with crying, and the hands begin to open from their clenched fist position.

3-6 months—The infant now begins to turn over from a prone position, begins to hold the head reasonably steady when held or placed in a sitting position, makes contact with objects nearby and brings them to the mouth to explore, starts to transfer objects from one hand to the other, starts to laugh out loud, and begins to have a preference for the person giving the most care.

6-9 months—The infant begins to creep, then crawl; can advance from lying down to a sitting position without help; begins to use the thumb and fingers to grasp an object rather than the entire hand; may release an object on request; uses the mouth to explore objects; may begin to repeat sounds (mama, da-da, etc.); can locate the direction of sounds; distinguishes familiar voices; and reacts pleasurably to music.

Of special consideration is the fact that the infant now begins to recognize Mother as an extremely important person and becomes apprehensive of strangers.

9-12 months—The infant now learns to stand without assistance and from that point will walk. This increases the area of exploration. Because this exploration is an intensive drive the infant will react almost violently when restrained.

Toddler (from one to three years of age)—Beginning in the second year of life, growth starts to slow. The most impressive change now is the alteration of body proportion. There is greater growth of the extremities in relation to the trunk. Until this growth evens out, the toddler will continue to look top-heavy.

Weight gain now averages about 10 pounds per year and increase in height will be about one foot during this period.

Bones now begin to mature and become stronger. Movements become more precise, enabling the toddler to move quickly from areas of safety to areas of danger.

Since further expansion of the skull is not required the suture lines begin to knit and the fontanels to close. Brain size is now about four-fifths that of an adult.

Teething continues, often to the physical discomfort of the child.

Development—Climbing now begins to advance the world the toddler has to explore. It begins with stairs at about 15 months and advances to furniture by about 18 months. Exploration now increases into things, such as drawers, closets, waste baskets, etc.

By age two the toddler's vocabulary has advanced to almost 100 words. Gestures and facial expressions, however, are a more frequent form of communication. Because of the limited vocabulary in addition to the noticeable difference in size between the toddler and surrounding persons, frustration commonly results in temper tantrums—a common behavior in this age group.

Because the concept of right and wrong is not yet recognizable, the infant sees no physical limitations. However, limits are needed to help provide some sense of security. The child wishes to cooperate but needs questions asked diplomatically. In other words, questions should only be asked if any answer will be accepted. **When the toddler has little or no choice in a particular matter, that toddler should be told what is to be done but, if possible, an additional choice given. For example, "Pat (name) I have to take you to the hospital. Do you want to take one of your favorite toys with you?"**

The toddler's mother is needed for comfort, security and support. As independence increases, dependence, especially on the mother,

is also increasing. The toddler's need for the mother is probably most acute in this age period. No one, except the mother, is really trusted; as the toddler is sometimes afraid of her desertion.

PRESCHOOLER (from three to six years of age)—

Growth—Weight gain now proceeds at about 4¼ pounds a year. Height continues at about 2¼ to 3¼ inches a year.

Development—Motor skills increase and become more precise. Now the preschooler can use tools, such as toy hammers, in a crude fashion; learns to cut out pictures; learns to dress and undress and, although mistakes are common, learns skills and forms independence. By late in this phase the preschooler will be able to run, skip, and jump, not only in place, but from heights.

At this stage, preschoolers' bodies become extremely important to them. They enclose the "whole self." Thus, these children are intensely afraid of pain and bodily injury, whether accidental or performed with a purpose. Band-Aids help, especially if the child is allowed to help in some way with their application. It is almost as if that act is a means by which the preschooler is "pulled together" and gains control of personal feelings about the situation.

SCHOOL AGE (from six to 13 years of age)—

Growth is now steady until adolescence. Weight increases by about seven pounds a year and height by about 2¼ inches a year.

Brain and head growth is slow, reaching adult rate by the end of this period.

Motor activities become more specialized; muscle movement stronger and smoother.

Permanent teeth now begin to appear.

Development—Independence now increases as the child moves out of the home and into school. The child now must learn to deal with new authority figures, new routines and new restrictions on activities. Responsibility also in-

creases. The seemingly endless energy and constant activity may just reflect the tension of the adjustment.

Play includes more interaction with others and the use of previously limited skills, such as throwing and catching a ball. In art the child can imitate more objects and will begin to use pencils and paintbrushes. The child also begins to learn about abstract terms such as "honesty" and "fair play."

The school-age child becomes more assertive in displaying independence, as much psychologically as physically. Competitive sports now become useful and important. As the child becomes part of a group, separation from the mother is easier. The need for her is still there but not as obvious. **The child will be content with having the mother nearby, especially during a crisis,** but the clinging seen earlier is not there.

This child displays the greatest amount of bravery when feeling the most helpless. If an adult does not intrude but remains nearby, the child may feel more secure.

Later in this stage hero worship is common. It is important in helping the child pattern behavior and responses and facilitates a transition to more mature behavior.

During this period, the child's vocabulary increases to about 7,200 words and delight is shown in sharing knowledge with others. The child, however, does not respond as readily to direct questions as to gentle persuasion. Children prefer relating events and knowledge in their own time.

Because of the increased vocabulary the child is now better able to express personal feelings in words but often uses games or play as an easier and less frustrating form of communication.

The child also begins to experiment with language, using slang and swear words.

This child is developing a new awareness of death and occasionally fears personal harm or harm to a loved one.

This child is especially sensitive about exposure of the body, especially in front of someone of the opposite sex.

ADOLESCENT (from 13 to 18 years of age)—

GROWTH—At this stage there is a noticeable spurt of growth. Height accelerates in the spring and weight in the winter. Legs become longer. By the end of the period, skeletal growth ends. There is a redistribution of fat, giving the body a new, more mature look.

Hormone activity now increases. In boys this occurs between 10 to 14 years and includes increased hair, voice changes, a more masculine appearance and the formation of sex characteristics. In girls this occurs between eight to 13 years and includes increased width of the pelvis, increases in hair distribution, a more feminine appearance with new fat distribution and the beginning of sex characteristics. Both sexes gain increased muscle strength and coordination.

Because of the accelerated growth, fatigue is common.

Development—At no other stage of development are changes so extreme and varied as in adolescence. Not only must teen-agers adapt to their rapidly changing bodies, but they must emancipate themselves from dependence on and attachment to their parents. There is also a definite struggle for emotional maturity. Assertion of their independence is strong yet frightening. They frequently need the strength of others because they don't have consistent stability in themselves.

Many have frequent, vague, ill-defined, physical symptoms. Disease is a major threat to their self-image. Helplessness is also a threat. Regression some times becomes necessary for limited periods as a temporary respite from pressure.

SPECIFIC PEDIATRIC EMERGENCIES

The remainder of this chapter deals with the many types of emergency situations, involving pediatrics, which may be encountered by the EMT and which are not covered elsewhere in this book.

AIRWAY OBSTRUCTION

Airway obstruction is usually relieved by proper positioning of the head. Whereas extending the neck of an adult by tipping the head back opens the airway, the small child breathes easier if the upper part of the body is elevated slightly and the neck is not extended quite so far. The neck of an infant is so pliable that forceful backward tilting of the head could obstruct breathing passages.

If infant or child is breathing, coughing or crying, do not interfere or attempt to clear airway.

If infant or child cannot make a sound but is conscious, the following techniques should be used.

BACK BLOWS AND CHEST THRUSTS

To relieve foreign body airway obstruction, a combination of back blows and chest thrusts is needed. Abdominal thrusts are not recommended for infants and children because of the potential danger of injury to the abdominal organs.

Infant—The infant should be straddled over the rescuer's arm with the head lower than the trunk (see Figure 1). The head must be supported with a hand around the jaw and chest. For additional support, the rescuer can rest the forearm on the thigh. Four back blows are rapidly delivered with the heel of the hand between the infant's shoulder blades. Care must be exercised, since much less force needs to be exerted than in the adult. Immediately after delivering the back blows, the rescuer places a free hand on the infant's back so the victim is sandwiched between the two hands, one supporting the neck, jaw and chest and the other in a position to support the back. While con-

tinuing to provide support to the head and neck, the victim is turned and placed on the thigh with the head lower than the trunk, and four chest thrusts are delivered in rapid succession in the same manner as external chest compressions are performed in the infant.

Child—The rescuer should kneel on the floor and drape the victim across the thighs, keeping the head lower than the trunk.

Four back blows can be delivered with somewhat greater force than that used for the infant. With the head and back supported, the child is rolled over onto the floor and is now in position for the four chest thrusts. These are applied in the same manner as external chest compression is applied for the child.

Blind finger sweeps are to be avoided in infants and children, since the foreign body can easily be pushed back and cause further ob-



Figure 1. Infant back blows

struction. In the unconscious victim, immediately after the chest thrusts, the tongue and lower jaw are lifted forward and the mouth opened. This is done by placing the thumb in the victim's mouth over the tongue, the other fingers are wrapped around the lower jaw. If the foreign body is visualized, it may be removed with a finger.

If the victim has not started breathing after this maneuver, the airway should again be opened and a seal made over the mouth or the mouth-nose of the victim and an attempt made to deliver four breaths. If the chest does not rise, the obstruction persists, and its relief must again be sought by using the above mentioned technique.

ARTIFICIAL VENTILATION

Ventilation, whether by mouth or mask, is effective if the chest rises and is allowed to fall between puffs. No matter how small the infant, do not try to achieve more than 20 puffs per minute. Do not blow harder than necessary to make the chest rise. The smaller the child, the easier it is to force air into the stomach. This can be expelled with gentle pressure on the left, upper portion of the abdomen. Be prepared to clear vomited stomach contents from the pharynx.

For infants and small children, the EMT's mouth covers both the mouth and nose of the child. The EMT then uses small breaths with less volume. The lungs should be inflated on the average of 15 times a minute for school-age children and about 20 times per minute for infants.

A plastic airway slipped between the tongue and palate is often helpful. If it does not make ventilation easier, a smaller one may be necessary. If not helpful, eliminate the plastic airway.

Artificial ventilation is best done by the simplest possible method. If mouth-to-mouth breathing works, do not be in a hurry to shift to a mechanical device. Catching a cold from a child is a small price to pay for saving a life.

CARDIAC MASSAGE

If the victim's pulse is not palpable, then a combination of rescue breathing and chest compression is indicated to circulate the blood around the body. It is in the technique of external chest compression that differences between infants, children and adults become apparent. The differences are related to the position of the heart within the chest, the small size of the chest, and the faster heart rate of the infant and child as compared with that of the adult.

Position of the Heart—As the chest grows, the proportion occupied by the heart diminishes. The heart in the infant and child is situated higher in the chest than it is in the adult. The proper area of compression in the *infant* is the midsternum. If an imaginary line is drawn between the nipples, the proper area of compression is the midportion of this line. A *child's* heart is lower than an infant's but not as low as an adult's. Using the technique as described for the adult, the notch in the center of the chest is located with the middle finger. The area just above the index finger is the appropriate area of compression in the *child*.

The chest of an infant or child is smaller and more pliable than that of an adult. Two hands are not necessary for proper compression. In an



Figure 2. Cardiac compression with tips of middle and index fingers.



Figure 3. Cardiac compression with heel of hand.

infant, two or three fingers are adequate (see Figure 2). With the fingers on the midsternum (between the nipples), the breastbone is compressed $\frac{1}{2}$ to 1 inch. The victim should lie on a hard surface for the rescuer to achieve best results. In the *child*, more force will have to be exerted. If the infant or child is large enough so that the sternum will not easily compress with three fingers, the heel of one hand will be needed. (See Figure 3.) Only the heel of the hand should be used; the fingers must be kept off the chest. If the victim is large enough to require the heel of the hand for compression, the depth should be increased to 1 to $1\frac{1}{2}$ inches.

Because of the inherently faster heart rate in infants and children, the compression rate must also be faster as follows: (1) Infants - 100 compressions per minute, (2) Children - 80 compressions per minute.

External chest compression must always be accompanied by rescue breathing, and the two must be coordinated. The ratio of compressions to respirations is 5:1, both for single and for two rescuers.

FEVER

Children with fever require medical attention. Mild elevation of temperature is usually only a symptom of illness, but fever over 104° can be

dangerous. The child should be cooled before and during transport. All clothing should be removed and the child covered with a towel saturated with tepid* water.

Ice water should never be used, as it may produce violent shivering, causing the temperature to rise rather than fall.

To cool a child's body:

1. Obtain two large bath towels.
2. Fill a basin with tepid water.
3. Remove all of the child's clothing.
4. Submerge both towels in the basin of water and apply one towel completely open on one side of the child's body (front or back).
5. Pat the towel (DO NOT RUB IT). When the towel becomes warm, remove it and place the other one on the other side of the child's body.
6. Repeat this procedure during transportation or until fever is lowered or controlled.

IMPORTANT NOTE:

1. Cool only one side of the body at a time.
2. Protect the child from the elements when moving from house to vehicle and vehicle to hospital.

* Tepid - Lukewarm (the water should neither be cool nor warm but approximately 98°); which if placed on the EMT's wrist would feel wet; but, since this is body temperature, a feeling of cool or warm would be absent.

CONVULSIONS

Convulsions are common in children and often are accompanied by fever. They can be very frightening for parents who have not dealt with them. The child should be protected from injury until the seizure stops. It is most helpful to the physician for the EMT to note what parts of the body are twitching, as often the parents are too distraught to do so. Frequently the seizure is over before the EMT arrives, but these observations may still be clear in the minds of those who saw the convulsion. The history should be obtained before transport, particularly from bystanders who will not be going to the hospital.

If the child is feverish, the temperature should be reduced before and during transport. Never submerge the child in a tub of water.

Regardless of the apparent cause, all children having a first convulsion should be checked by a physician. While most seizures are harmless, a few signify serious problems such as meningitis or a brain tumor.

If a child has had seizures before, it is wise to have the parents bring any of the medications being taken by the child, as the receiving physician may not know the child's history. Children with recurring convulsions need not always be transported, provided the seizure has stopped and the child's own physician has been contacted.

PEDIATRIC PATIENTS WITH HEART DEFECTS

DEFINITION

Pediatric patients with heart defects are prone to illness and injuries just as other children. At times their "emergencies" may be related to a heart problem but at other times they may need your help for a variety of reasons—cuts, bumps, bellyaches, objects in their nose and ears and broken bones. A heart problem does not make a child fragile. It does, however, often make a child a bit more vulnerable to problems or complications ordinarily not encountered with other children. Only rarely does this defect cause or compound a situation that will require truly acute emergency care.

The EMT may be called to see a child who has a heart defect. This information should prove helpful in evaluating the child, then determining appropriate action.

QUESTIONS

1. Why were you called to see this child?
2. Is this emergency directly related to a heart defect?
3. Can the child, parent, or responsible adult with the child tell you what the heart defect is (or was)?
4. Is the defect repaired? (If so, when?), as yet unrepaired? or irreparable?
5. At what hospital has the child been seen previously?
6. What is the name of the local physician treating the child in regard to the heart defect?

7. Have there been any problems in the past related to the heart defect? If so, what were they and how were they handled?

8. Is the child now or recently been on any medications? If so, what are (were) they?

PHYSICAL EXAMINATION

1. Vital signs (including signs of perfusion)

- a. Temperature:

Does the child feel hot, cold or normal to touch? Are the hands and/or feet noticeably cooler than the trunk or head?

- b. Pulse:

What is the rate? (Apical pulses are preferred.) Is it strong? Weak? Clear? Muffled? Distant?

- c. Respirations:

What is the rate? Is the breathing easy or labored? Is the breathing quiet or noisy? Does the child breathe through the mouth? Are there any retractions?

- d. Blood Pressure:

Can you hear a blood pressure or only feel one? Where was the blood pressure obtained? (which extremity?) What size cuff was used?

2. Skin:

Is the skin warm or cool? Is it dry? Moist? Clammy? Is the tone firm or loose? Are the mucous membranes (especially inside the mouth) moist or dry? Pale? Pink? Glistening? Dull?

3. Color:

Is the child pink? Pale? Dusky? Cyanotic? If

there are changes in color, how prominent and extensive are they? Can anyone tell you how the child's present coloring compares with the child's usual coloring.

SEEK PROFESSIONAL GUIDANCE

After the above questions have been answered and the physical examination has been completed, the child's physician (cardiologist or family doctor) or the emergency room physician should be called, if possible, unless the situation warrants little or no delay in transporting the child to the hospital.

If contacted, the physician will be able to give advice on the preferred treatment and guide you in deciding whether or not the child should be seen and, if so, how soon.

EMERGENCY CARE

If you are unable to contact the physician and the emergency is or may be related to the heart defect, the best treatment is supportive therapy.

1. Administer oxygen as necessary. Remember, however, that some children with heart defects that have not been or cannot be repaired are normally "blue." In these cases the oxygen will not make them "pink" but may only lessen the "blueness."

2. Monitor vital signs.

3. Transport to the nearest hospital capable for evaluating and caring for this child.

If the emergency is not directly heart-related, treatment is essentially the same as for any other child. If possible, however, the attending physician should be called.

Any child with a known heart defect, repaired or not, with evidence or history of:

- a. dehydration,
- b. infection,
- c. unusual respirations,
- d. pulse irregularities (either rate or rhythm),

- e. penetrating injury, no matter how slight,
- f. reported change in physical appearance even if, upon arrival, the child seems okay, or
- g. any blow to the body of a child on anticoagulants

MUST be evaluated by a physician.

Because . . .

- a. Children with cyanotic defects, if dehydrating, are especially prone to the possibility of a stroke as the blood becomes less dilute.

- b. Infections, no matter how seemingly minor, have the potential for entering the bloodstream. One of the most major secondary sites is at the site of the defect, even one that has been repaired.

- c. Changes in respirations may be an indication of developing heart failure.

- d. Irregularities of rate or rhythm, although often benign, need to be evaluated. They may indicate a problem or potential problem, especially if they persist.

- e. Penetrating injuries provide sites of possible infection (see "b").

- f. Some children, especially with unrepaired defects, may have transient attacks with color changes, variations in pulse rates, difficulty breathing, etc. Although these may last only a few minutes, they may signal impending problems.

- g. A child on anticoagulants (frequently after valve replacements) may begin bleeding slowly following a fall or blow. Symptoms may not be apparent immediately. By the time the blood loss is sufficient to produce symptoms, the damage at the site and secondarily from stress to the heart, may make treatment especially difficult as well as placing the child in a potentially life-threatening situation.

Situations which may seem major outside the hospital may require only a minimum amount of treatment in the hospital. However, illnesses or injuries that seem minor, if neglected or

improperly treated outside the hospital, may cause problems that may later require prolonged and intensive therapy.

HEART FAILURE

Heart failure is a condition in which the heart is unable to maintain effective circulation throughout the body. In children this is usually the result of congenital heart defects. Although it is customary to separate right from left-sided failure, one will often lead to the other.

SIGNS AND SYMPTOMS

In children signs and symptoms of heart failure may include easy fatigability; tachycardia; increased respiratory rate (tachypnea); decreased appetite; possible vomiting; respiratory difficulties appearing as pneumonitis (fever, cough, wheezing); or noisy, labored respirations with retractions and nasal flaring; and diaphoresis.

EMERGENCY CARE

Monitor vital signs.

Allow the child to seek a position of comfort, often sitting up straight.

Administer oxygen.

Transport to the hospital.

REYE'S SYNDROME DEFINITION

In Reye's Syndrome, for unknown reasons, the brain becomes markedly swollen but without evidence of inflammation. The liver cells become infiltrated with small fat droplets. Similar fatty infiltration occurs in the kidneys, heart and other organs.

This disorder is becoming one of the more common causes of death in children. It may occur at any time during childhood from infancy to adolescence.

SIGNS AND SYMPTOMS

The onset of symptoms of Reye's Syndrome occurs in connection with a viral illness (e.g.,

chicken pox, upper respiratory infection, influenza, etc.). The child appears to be recovering from the initial disease then develops recurrent vomiting which may last 24-48 hours. Toward the end of this period, changes in the child's mental status become apparent, often occurring as irritability and restlessness alternating with lethargy and deep sleep. This clinical triad (viral illness—vomiting—change in mental state) forms the basis for the diagnosis of Reye's Syndrome. As the disease progresses additional symptoms may appear. These include profoundly disturbed states of consciousness, abnormal respiratory patterns, fever, seizures, enlarged internal organs (especially the liver and spleen) and coma.

Early diagnosis is essential for proper management. The disease may progress to irreversible damage and possible death in as little as 24 hours from the onset of the change in mental state. Death occurs when the swelling of the brain causes compression of the brain stem (the life support center of the brain). Changes often occur extremely rapidly and can bring the child close to death in only a matter of minutes.

EMERGENCY CARE

Recognize the possibility of Reye's Syndrome.

Maintain an adequate airway.

Keep the head in alignment with the body when possible. (Allowing the head to remain turned to the side increases pressure inside the head.)

NOTE: Do not attempt to restrain the head of a child who is thrashing about and restless. This will only increase irritability.

Closely monitor vital signs and neurological status.

Transport to hospital as soon as possible.

DIARRHEA

Diarrhea is the frequent evacuation of watery stools. Vomiting and diarrhea are second only to fever as signs of disease.

POSSIBLE CAUSES

Diarrhea may be brought on by gastrointestinal infection (viral, bacterial, parasitic), overfeeding, poisoning or ingestion of irritating substance, some intestinal obstructions, pneumonia, urinary tract infections, ear infection, oral antibiotics, inflammation of the large bowel, allergy, as well as by emotional causes.

Fifteen or more stools per day with evidence of marked dehydration is considered to be severe diarrhea and is a medical emergency.

EMERGENCY CARE

Check vital signs.

1. Check for dehydration.
2. Obtain history—appetite; how frequent are stools; has child complained of any discomfort?; character of stools; any known illnesses.
3. Transport if there are signs of marked dehydration, shock, depression of mental status or an abnormal respiratory pattern.
4. If the child is not being transported, suggest same treatment as for vomiting:
 - Nothing by mouth for 2-3 hours
 - Clear liquids, non-carbonated
 - Slowly advance to regular diet in 12-24 hours

Vomiting and diarrhea cause loss of electrolytes as well as fluid. The presence of both vomiting and diarrhea can cause rapid and significant loss of fluids as well as essential body salts (electrolytes). Children can easily become dehydrated creating a medical emergency in itself, even without the presence of a specific medical or surgical problem.

DEHYDRATION

Dehydration is the excessive loss of body water and accompanying electrolytes.

POSSIBLE CAUSES

The possible causes of dehydration are fever; vomiting; diarrhea; burns; diabetes mellitus; diabetes insipidus (markedly increased urine output, negative for sugar, caused by a deficiency in the antidiuretic hormone released by the brain); urinary tract infections; hemorrhage; peritonitis; excessive perspiration, especially in hot weather; insufficient fluid intake (especially in babies and mentally retarded or handicapped children unable to help themselves).

SIGNS AND SYMPTOMS

A victim of dehydration experiences thirst; apathy; restlessness; dry skin, lips, tongue; white, sticky saliva; poor skin turgor (when the skin of the abdomen is lightly drawn up, then released, it does not quickly fall back into position); record of decreased urine output; increased pulse; possible decrease of blood pressure; extremities may be cool and clammy. (Because dehydration is the loss of fluid, the patient will have the symptoms and signs associated with hypovolemic shock, depending on the degree of dehydration.)

EMERGENCY CARE

Treatment of this condition depends upon the degree of dehydration:

- 5%—dry mucus membranes basic sign. May encourage fluids. Suggest parents call child's doctor.
- 7-10%—change in skin turgor, cool extremities, possible changes in sensorium. Generally requires intravenous fluids so will need to be seen by doctor or emergency room personnel.
- 15%—poor perfusion, changes in vital signs, signs of shock.

MEDICAL EMERGENCY—A victim of dehydration requires immediate intravenous fluids and transport to hospital.

NEUROLOGICAL EVALUATION OF INFANTS

Because an infant functions only on a primitive, brain stem level, not yet having developed the higher centers of the brain, either in thought or responsiveness, it becomes more difficult to evaluate the child when possible problems arise.

Signs may be minimal but the most useful diagnostic tool is CHANGE, and change is most effectively followed and documented when there is a continuing accurate picture of the infant.

GENERAL APPEARANCE

WHAT IS THE INFANT'S GENERAL PHYSICAL APPEARANCE?

Are the child's eyes bright and clear, or dark and dull? Is the coloring pink, flushed, pale, dusky, or even cyanotic? Is the skin tone good or does it feel loose and mobile? Is the infant comfortably warm to the touch, hot, or cold? Is there any evidence of physical trauma?

WHAT IS THE INFANT'S GENERAL BEHAVIOR PATTERN?

Is the child quiet, sleeping peacefully, fussy, fretful, irritable, active, restless?

WHAT IS THE PATTERN OF THE CHILD'S MOVEMENTS?

Are movements easy and flowing, jerky, rigid, flaccid? Do any of the movements suggest possible seizure activity? Does the infant's position seem natural for an infant?

IS THERE ANY EVIDENCE OF ASYMMETRY OR MALFORMATION?

When crying, does one side of the mouth seem to be drawn down? Do all extremities move equally or does one side or extremity vary, either in amount or character of motion? Does any area of the body seem out of proportion with the rest of the body?

HISTORY

What prompted the concern in the infant's status?

Has the parent noted any progression in symptoms?

Has the infant stopped doing things that have already been learned? For example: smiling, cooing, turning over, crawling, playing with nearby objects or toys.

What are the differences now noted? Include objective data such as vomiting or diarrhea and subjective data such as not eating as well, poor sucking, differences in the cry, fussier, sleepier.

Do any of the symptoms occur at any particular time of day or in relationship to any particular event?

Is there anything that seems to alleviate or aggravate the symptoms?

Has the infant had any prior problems, either ones that may have prompted medical attention or just some that may have caused some concern?

Is the infant being given any medication?

PHYSICAL EXAMINATION

Take and record the vital signs (temperature, pulse and respirations). It is most important to note the quality of the respirations. Increasing pressure within the head can cause changes in the character of breathing and may indicate the need for rapid medical intervention.

Examine the skull both by sight and touch. Check for any deformity, irregularity, or signs of trauma. Feel the soft spot (fontanel) at the top of the head. It should be even with the surrounding skull and feel fairly soft. A depressed or indented fontanel may indicate dehydration. A bulging, tight fontanel (when the infant is quiet) may indicate a rise in pressure within the head.

Check the pupils of both eyes. Are they large (dilated), small (constricted), or mid-position? Are the pupils equal in size? When subjected to a bright light, do they both constrict readily?

Check the eyes for motion and position. The eyes should be fairly well centered and move together equally. Note whether the eyes seem to be looking downward, whether one eye seems to be turning independently to one side or the other, or if there is any rapid movement of the eyes.

Check for response to stimulus. What is required to elicit a response? Does the infant move when a sound is heard, or motion is felt or is some degree of pain required to cause movement? What is the subsequent movement noted? Do all extremities move well together? Does one side seem slower or weaker? Are the movements weak, jerky, rigid, uncoordinated, or is there a lack of any motion? When movement occurs, is it natural or do any of the extremities assume an unnatural or awkward position?

Bend the head forward to the chest if there is no indication of trauma. Does this elicit resistance or a cry of pain? If this occurs it may

well indicate an irritation or infection within the head.

Complete a general physical examination of the infant. Too often other physical problems are overlooked which might be even more serious than the neurological problem.

CONCLUSION

Neurological checks should be repeated approximately every 10 to 15 minutes. These continuing checks should include pulse and respirations, level of consciousness, response to stimulus, and pupil checks. Changes do not have to be overwhelming to indicate a problem. Many of the changes that do occur are subtle and oftentimes slow; but it does not mean they are any less important. The sooner the situation can be evaluated and treatment begun (if needed), the greater the possibility for a more rapid and complete recovery.

CHILD ABUSE

Death from abuse is third only to sudden infant death syndrome in children under six months of age and true accidents in children under five years of age.

Child abuse is basically the mistreatment of a child by a parent or parent substitute. It includes physical abuse, sexual abuse, neglect, emotional abuse and emotional neglect. The most prominent is physical abuse. The term "battered child" is most often linked to this category. This area includes children who are physically restrained in such a manner as to leave marks or cause injury, moved or pushed with sufficient force as to cause trauma, or punished in such a way as to cause harm. Sexual abuse refers to any sexual contact between an adult and child, whether or not physical injury occurs. Neglect is the denial of physical, medical, educational, moral or other essential needs of the child. Emotional abuse and neglect are instances where the child is made to feel inadequate or inferior by means of words or actions or simply denied the benefits of personal caring or attention.

CHILDREN

Children sometimes have certain characteristics that make them more likely to be abused. The child who is chronically ill, has repeated minor illnesses, is hyperactive, is difficult to satisfy, and/or makes increasing demands on a parent inadvertently increases the chance of being abused. Infants and preschool-age chil-

dren, because they are defenseless, demanding and have little or no vocabulary, constitute a large number of abused children.

Often, however, there is no outward indication that the child is not just like other children. Problems can occur when an adult perceives a particular child as being different or has unrealistic expectations of the child.

Children who have been or are being repeatedly abused may exhibit certain characteristics. Their behavior may seem inappropriate for their age. They may cry too much or too little; show an unusual degree of fear of adults or no fear at all; exhibit aggression or withdrawal. They may be cautious of any physical contact with adults or become apprehensive when an adult approaches. Some may have learned to play the role of an adult for their parents and will thus attempt to cater to the needs of any adult. Although visibly a child, attitudes and manners of the child are far too adult-like. On the other hand some may still retain inappropriate infantile behavior such as persistent thumb-sucking or constantly cradling a blanket or favorite toy. They also tend to become apprehensive when they hear other children crying. The type of behavior exhibited usually has a direct correlation to the severity and type of abuse; i.e., the greater the fear and withdrawal the greater the degree of abuse.

Children who are physically abused may dress inappropriate for the season. Wearing long-sleeved clothes or tops with high necks or avoiding undressing for gym may be attempts to conceal marks of abuse.

Children who are neglected are often poorly dressed for the season, constantly tired and listless, and may display little or no emotion.

ADULT

The majority of abuse or neglect of children involves a parent; although another who assumes even temporary responsibility as "care-taker" may be the abuser.

The vast majority of parents who abuse or neglect their children are not insane nor are they criminals. They are, however, stressed individuals who are unable to adequately function under stress. It is often found that they, themselves, were mistreated or abused as children.

POSSIBLE INDICATORS OR PHYSICAL ABUSE

BRUISES AND WELTS

Bruises and/or welts may be found on the face, buttocks, back, arms and legs. Unusual patterning may be suggestive of the instrument used. Clusters of bruises may indicate repeated abuse. Bruises are often seen in varying stages of healing.

BURNS

Immersion in hot liquid can often be seen as "stocking" burns of arms or legs or "donut" burns of the buttocks. Burns from a lighted cigarette are common. Rope burns indicate confinement or restraint. Dry burns occur from contact with a hot surface.

LACERATIONS AND ABRASIONS

Skeletal Injuries—Although many skeletal injuries can be minor, they are usually caused by twisting or pulling. Extensive skull fractures

or major limb fractures usually occur when a child is thrown.

Rib fractures may occur when the child is kicked or pushed against a protruding object.

Head Injuries—Possible head injuries of the abused child may include:

- Fractured nose or jaw
- Missing teeth due to a hard blow to the face
- Retinal hemorrhages
- Absence of hair in irregular patches
- Scalp hematomas
- Subdural hematomas—in young children this can occur merely by shaking the child vigorously
- Varying degrees of brain swelling

Internal Injuries—Internal injuries involve the rupturing of internal organs with subsequent hemorrhaging and the rupturing of major blood vessels.

Internal injuries and head injuries are the most common causes of death in abused children.

POSSIBLE INDICATORS OF NEGLECT

Possible signs of neglect which may indicate child abuse may include:

- Malnutrition and dehydration
- Excessive diaper rash
- Uncleanliness
- Unsuitable clothing
- Little or no adult supervision
- Inadequate shelter
- Notably poor housekeeping
- Evidence of lack of medical or dental care
- Fatigue, nervousness

Although any of these injuries or situations could occur accidentally, the suspicion that they may be the result of abuse or neglect warrants further consideration, observation or investigation.

IDENTIFICATION OF ABUSE OR NEGLECT

Abuse may be suspected in generally three ways.

1. The injuries suggest non-accidental causes, may be out of proportion to the "accident" that reportedly caused them, or the injury cannot be satisfactorily explained.

2. Younger children may occasionally state that a particular person "hurt" them. The child's attitude may suggest fear or apprehension of adults, and the child may avoid any contact with an adult, even if the contact is non-threatening. This child often usually is fearful of the situation; may exhibit little or no reaction to pain; may be unusually quiet or watchful; may have a vacant, almost frozen stare; and answer questions with quiet, one-syllable replies. Older children may have a sense of guilt, believing they were the cause of their own mistreatment. Often they become quite protective of their parents. Although verbally protective, they may seem visibly frightened of the parent.

3. Parents' behavior may seem inappropriate under the circumstances.

WORKING WITH AN ABUSED OR NEGLECTED CHILD

Children who are suspected of being abused or neglected need to be approached in a non-threatening manner. All procedures need to be calmly explained in detail. Despite feelings of anger, it is important the child not sense that anger, for often the child will feel guilty and responsible for any personal injuries. If the child seems to fear physical contact or the presence of adults, the contact should be limited. Any object that represents security for the child should be kept with the child. Questioning should be kept to a minimum. Initial treatment is aimed at caring for the specific injuries that have been sustained.

At the same time it is important not to deal with the parents in a threatening manner. If they indeed abused their child, they will be more receptive to someone who expresses concern for **their** needs as well. The rapport that is initially established will serve to facilitate or hamper future contact by any professional.

IDENTIFICATION AND REPORTING OF CHILD ABUSE AND NEGLECT

Laws pertaining to the reporting of suspected child abuse vary significantly from one state to another. Presently in Ohio anyone has the **right** to report a suspected case of abuse or neglect. Health care professionals, however, are **required** to report such cases according to the Ohio Revised Code, Section 2151.421.

It will be your responsibility to determine the steps that are or should be followed in your own situations. Being the first person to see these children in a number of instances, you are in a prime position to make observations, create a constructive rapport, and relay information to the proper people—whether they be emergency room personnel, social service workers, or community resource individuals. Docu-

mentation of your findings and any subsequent communication is important.

SUMMARY

If good, common sense can be said to be more important in one emergency situation than the

other, it would surely be pediatric emergencies.

Many of your emergency medical procedures for children are the same as for adults, but the handling of the child victim and the parents will, on many occasions, be an extremely rough challenge.

Available EMS Publications

For ordering and pricing information contact:
Vocational Instructional Materials Laboratory
The Ohio State University
154 W. Twelfth Avenue
Columbus, Ohio 43210
Phone (614) 422-5001

Emergency Victim Care—Student Manual (EVCN)
Emergency Victim Care—Instructor Manual (EVCIM)
Emergency Victim Care—Workbook (EVWB)
EMS Binder—2½" Three-ring binder (EMTB)
Advanced EMT Instructor Manual (EVAIM)
EMS Slide/Tape Series
—Bleeding Control — 42 slides (EMST-1)
—CPR — 72 slides (EMST-2)
—Extrication — 79 slides (EMST-3)
—Fractures — 139 slides (EMST-4)
—Moving and Handling — 111 slides (EMST-5)
—Proper Examination — 68 slides (EMST-6)
—Vital Signs — 28 slides (EMST-7)
—Wounds and Bandaging — 79 slides (EMST-8)
—Anatomy and Physiology (EMST-9)
Victim Rescue Manual—Student Manual
Victim Rescue Manual—Instructor Manual
River Rescue Manual—Student Manual
River Rescue Manual—Instructor Manual
Farm Accident Rescue Manual